PUBLIC HEALTH REPORT

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The Deadly Din

NOISE IS UNWANTED and intrusive sound. Technological progress brings with it an ever-increasing environmental cacophony and noise has become not just an adjunct, but a permanent part of modern man's life. As such, it constitutes one of the chief drawbacks to the enjoyment of urban living. We have long recognized that noise is both an occupational hazard and a public nuisance. Has urban noise now reached intensities which pose a danger to community mental or physical health? There are indications that it has. Noise has become another environmental pollutant.

For California industry, programs to conserve the hearing of employes are recommended when daily exposure to sound levels continuously for over five hours exceeds 85 decibels in the principal speech frequencies; and they are mandatory when the level goes above 95 decibels. It must be added that even the lower limit will not prevent hearing impairment in hypersusceptible persons. Yet some urban noise intensities currently approach or exceed these occupational damage-risk criteria. The situation becomes more ominous in light of a report that urban sound levels in the United States are increasing by one decibel per year.

Sound pollution has grown *pari passu* with air pollution. Especially in California's major metropolitan areas, this side-by-side growth is no coincidence. Here, the major source of air and sound pollution stems from the internal combustion and related types of engines, machinery and equipment: Jet and propeller aircraft, automobiles, buses, motorcycles, trucks and the like are producers of both air and sound pollutants. Other sources of community noise are public entertainment and amusement places; electric substations and air-conditioning systems; radio and television sets, and electrical-mechanical household appliances; percussion and other musical instruments, especially those electronically amplified. Additional major sources are horns and sirens; mechanized industrial operations and construction, repair and demolition equipment.

The effects of occupational overexposure to sound are well known. Chronic industrial overexposure produces permanent hearing loss. In addition, an explosion's momentary intensive impulse noise can damage ear structures and cause deafness. At the larger community level, excessive noise affects sleep and efficiency, interferes with speech and communication, and causes fatigue. Noise constitutes a source of annoyance and complaint—especially if it is considered unnecessary. Extreme loudness, however, is not an essential component of disturbing sounds. The interpretation of and reaction to noise are highly subjective. In fact, one man's music is another man's noise.

Noise stress can produce uncontrollable physiological strain in affected persons. Vasoconstriction, skin blanching and muscular contraction occur, together with sudden hormonal discharge which further increases tension and anxiety. In turn, cardiovascular, neurological and other system functions are affected. Recent otological studies indicate that the louder the environmental sound levels, the earlier and more pronounced the onset of presbycusis. The psychological effects of noise are equally important, especially to per-

sons with debilitating, chronic physical or emotional disorders. In addition to overt stress reactions, noise may produce subtler psychological and physiological strains, more difficult to detect or measure — an area still needing much medical study.

Evaluations both of community noise and reaction to sound pollution are complex. Many factors must be studied at each key location: Noise characteristics, time of its occurrence or recurrence, topography, house construction standards, residential or industrial characteristics. How the community developed, its economic basis and the attitudes of its members are also factors which must be understood. These factors must then be correlated with group psychology, plus political and economic considerations.

The present lack of precise community noise criteria and standards should not be surprising, therefore. Dearth of related clinical and epidemiological studies, lack of appropriate funds and insufficient numbers of technical personnel have also retarded development of standards. Nevertheless, many communities are considering or have adopted antinoise regulations, usually based on studies done in other cities. The basic idea is excellent. Such regulations, however, must bear a direct relationship to the existing background spectrum within the specific municipality. Otherwise, they are inapplicable, unenforceable and, as a result, useless. Once more, want of technical and budgetary resources often delays solutions. There is no simple pattern fitting every community with standards for noise control.

The problem is by no means unsolvable. Many effective noise abatement measures exist and can be implemented. Zoning regulations around potential or actual noise sources can be established. For example, undeveloped areas around airports would specifically exclude land use for dwellings. Unnecessary use of vehicular horns and sirens should be curtailed. Construction, demolition and street repair equipment, industrial and office machines, household appliances and all types of internal combustion engines can be made quieter through proper engineering control systems. Governmental regulations also can be of assistance, as for example the recently established California Motor Vehicle Noise Limits, which became effective 1 January 1968.

Multiple-dwelling buildings and private homes are other areas where applicable building standards and control systems are necessary. External and internal sound controls such as the placement of trees, baffles, partitions and the use of furnishings having better acoustical insulation and other desirable properties can be employed to modify or reduce transmission of airborne or impact sounds produced by surface and aircraft traffic, footsteps, slamming doors, garbage disposal units, bathroom and other fans and the like.

The present state of acoustical science, with engineering and industrial technology, can provide effective sound control systems and devices —a costly but essential approach which will very likely require practical, reasonable governmental action. But legislation by itself will not solve the problem. To succeed, community noise abatement programs must also have massive support from industry, the medical and health professions, and especially from the public, whose health remains the prime consideration.

A noise-polluted environment produces deleterious effects on man. The imminent advent of commercial supersonic transport aircraft and related sonic booms will magnify the problem. Can the community afford to wait for possible evidence of widespread disabilities produced by excessive sound? Before the issue becomes clouded by hysteria, a reasoned, concentrated and realistic effort must be made to find solutions. Here lies a challenge to medicine and the allied professions.